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Our address is: 7800-2003-05154516  
Our ref: 0503-9713084 /Amy Nelson

What Is Claimed Is:

1       1. An image sensor with improved uniformity of  
2 effective incident light, comprising:

3 a chip having a plurality of sensing areas being  
4 capable of receiving incident radiation and a  
5 stacked transmission layer covering the sensing  
6 areas; and

7 a plurality of microlenses covering the stacked  
8 transmission layer, the size of each microlens  
9 being a function of the distance between the  
10 microlens to a chip center.

1       2. The image sensor with improved uniformity of  
2 effective incident light of claim 1, wherein the sizes of  
3 the microlenses are altered based on the distance between  
4 the microlenses to the chip center such that the  
5 photoenergies received by the sensing areas are more  
6 uniform.

1       3. The image sensor with improved uniformity of  
2 effective incident light of claim 1, wherein the size of  
3 each microlens increases as the distance from the microlens  
4 to the chip center increases.

4. The image sensor with improved uniformity of effective incident light of claim 3, wherein the microlenses disposed in the edge region are kept at an original size.

5. The image sensor with improved uniformity of effective incident light of claim 4, wherein the size of the microlenses disposed in the center region is reduced by 5-50

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4 % compared with the size of the microlenses disposed in the  
5 edge region.

1 6. The image sensor with improved uniformity of  
2 effective incident light of claim 5, wherein the size of the  
3 microlenses disposed in chip center is reduced by about 20 %  
4 compared with the size of the microlenses disposed in the  
5 chip edge.

1 7. The image sensor with improved uniformity of  
2 effective incident light of claim 1, wherein the sizes of  
3 the microlenses are progressively increasing from the chip  
4 center to a chip edge such that the brightness in different  
5 regions of the chip is balanced.

1 8. The image sensor with improved uniformity of  
2 effective incident light of claim 7, wherein the difference  
3 between the sizes of the microlenses disposed in the chip  
4 center and in the chip edge is 5-50%.

1 9. The image sensor with improved uniformity of  
2 effective incident light of claim 8, wherein the difference  
3 between the sizes of the microlenses disposed in the chip  
4 center and in the chip edge is about 20%.

1 10. The image sensor with improved uniformity of  
2 effective incident light of claim 1, wherein the microlenses  
3 are divided into a plurality of groups, and the size of the  
4 microlenses in each group is constant.

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Our ref: 0403-971308: Amy /Nelson

1 11. A device comprising an image sensor of claim 1  
2 embedded therein.

1 12. An image sensor with improved uniformity of  
2 effective incident light, comprising:

3 a chip having a plurality of sensing areas being  
4 capable of receiving incident radiation;  
5 a plurality of color filter units corresponding to each  
6 sensing area and disposed overlying the sensing  
7 areas; and  
8 a plurality of microlenses overlying the color filter  
9 units, the distance between a center of the  
10 microlens and a center of the corresponding  
11 sensing area being a function of the distance  
12 between the corresponding sensing area to a chip  
13 center, each microlens overlying its  
14 corresponding color filter unit without overlying  
15 adjacent regions thereof.

1 13. The image sensor with improved uniformity of  
2 effective incident light of claim 12, wherein the distance  
3 between the center of each microlens and the center of the  
4 corresponding sensing area is altered based on the distance  
5 between the corresponding sensing area to a chip center such  
6 that the photoenergies received by the sensing area are more  
7 uniform.

1 14. The image sensor with improved uniformity of  
2 effective incident light of claim 12, wherein the distance

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Our ref: 0903-0713US1 /Amy /Nelson

3 between the center of the microlens and the center of the  
4 corresponding sensing area increases as the distance between  
5 the corresponding sensing area to the chip center increases  
6 such that the brightness in different regions of the chip is  
7 balanced.

1 15. The image sensor with improved uniformity of  
2 effective incident light of claim 12, wherein the  
3 microlenses are divided into a plurality of groups, and the  
4 microlenses in each group have a corresponding constant  
5 distance between the center of the microlenses and the  
6 center of the sensing area.

1 16. The image sensor with improved uniformity of  
2 effective incident light of claim 15, wherein the groups at  
3 least comprise a first group and a second group adjacent to  
4 the first group, the first group closer the chip center than  
5 the second group, wherein the microlenses in the second  
6 group are shifted by decreasing a gap between two adjacent  
7 microlenses belonging to the first and second groups while  
8 the other microlenses in the second group are shifted  
9 without decreasing the gaps there between, and the color  
10 filter units are shifted by reducing the size of the color  
11 filter unit belonging to the second group adjacent to  
12 another color filter unit belonging to the first group while  
13 the other color filter units in the second group are shifted  
14 without reducing their sizes.

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Our ref: 0603-9713USE /Amy Nelson

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1        17. The image sensor with improved uniformity of  
2 effective incident light of claim 15, wherein each group  
3 comprises at least two sensing areas.

1        18. The image sensor with improved uniformity of  
2 effective incident light of claim 12, further comprising an  
3 IC transparent stacked layer between the sensing areas and  
4 the color filter units.

1        19. A device comprising an image sensor of claim 12  
2 embedded therein.

1        20. An image sensor built in a chip, comprising:  
2            a semiconductor substrate;  
3            a plurality of sensing areas being capable of receiving  
4            incident radiation formed in the semiconductor  
5            substrate;  
6            a plurality of color filter units corresponding to each  
7            sensing area and disposed overlying the sensing  
8            areas; and  
9            a plurality of microlenses overlying the color filter  
10          units, the distance between a center of the  
11          microlens and a center of the corresponding  
12          sensing area being a function of the distance  
13          between the corresponding sensing area to a chip  
14          center, each microlens overlying its  
15          corresponding color filter unit without overlying  
16          adjacent regions thereof.

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Our ref: 5563-971301 /Amy /Nelson

1        21. The image sensor of claim 20, wherein the distance  
2 between the center of each microlens and the center of the  
3 corresponding sensing area is altered based on the distance  
4 between the corresponding sensing area to a chip center such  
5 that the photoenergies received by the sensing area are more  
6 uniform.

1        22. The image sensor 20, wherein the distance between  
2 the center of the microlens and the center of the  
3 corresponding sensing area increases as the distance between  
4 the corresponding sensing area to the chip center increases.

1        23. The image sensor of claim 20, wherein the  
2 microlenses are divided into a plurality of groups, and the  
3 microlenses in each group have a corresponding constant  
4 distance between the center of the microlenses and the  
5 center of the sensing area.

1        24. An image sensor built in a chip, comprising:  
2           a semiconductor substrate;  
3           a plurality of sensing areas being capable of receiving  
4           incident radiation formed in the semiconductor  
5           substrate;  
6           a stacked transmission layer covering the sensing  
7           areas; and  
8           a plurality of microlenses covering the stacked  
9           transmission layer, the size of each microlens  
10          being a function of the distance between the  
11          microlens to a chip center.

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Our ref: 0403-9718151 /Amy /Nelson

1        25. The image sensor of claim 24, wherein the sizes of  
2        the microlenses are altered based on distance between the  
3        microlenses to the chip center such that the photoenergies  
4        received by the sensing areas are more uniform.

1        26. The image sensor of claim 25, the size of each  
2        microlens increases as the distance between the microlens to  
3        the chip center increases.

1        27. The image sensor of claim 24, wherein the  
2        microlenses are divided into a plurality of groups, and the  
3        microlenses in each group have a corresponding constant  
4        size.